Nuclear Energy University Programs

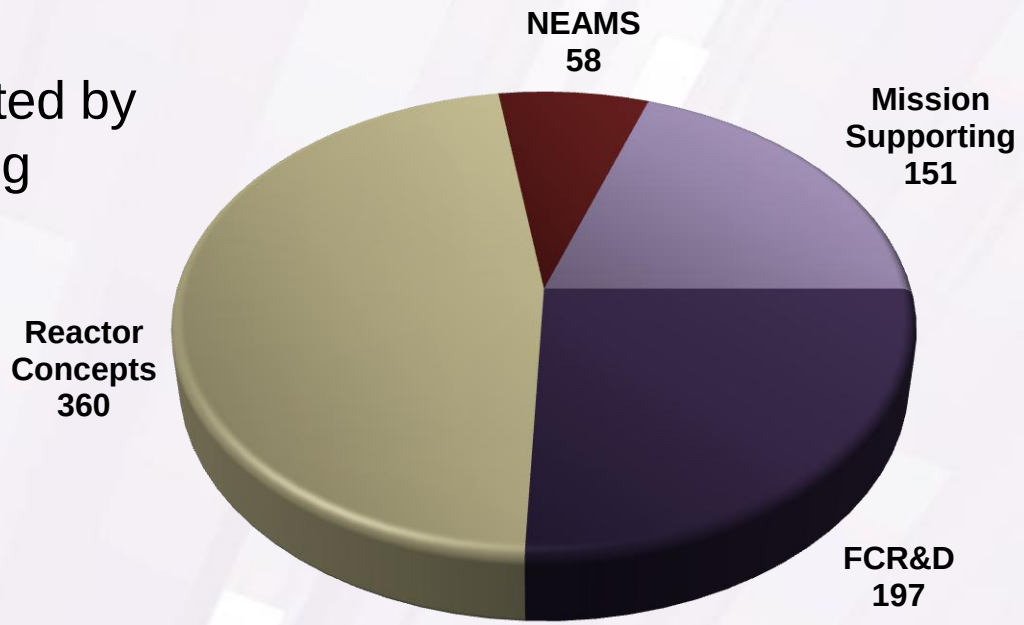
Review of the NEUP Program in 2011

Dr. Marsha Lambregts
NEUP IO Program Manager

R&D Request for Pre-Applications

Submitted Pre-Applications

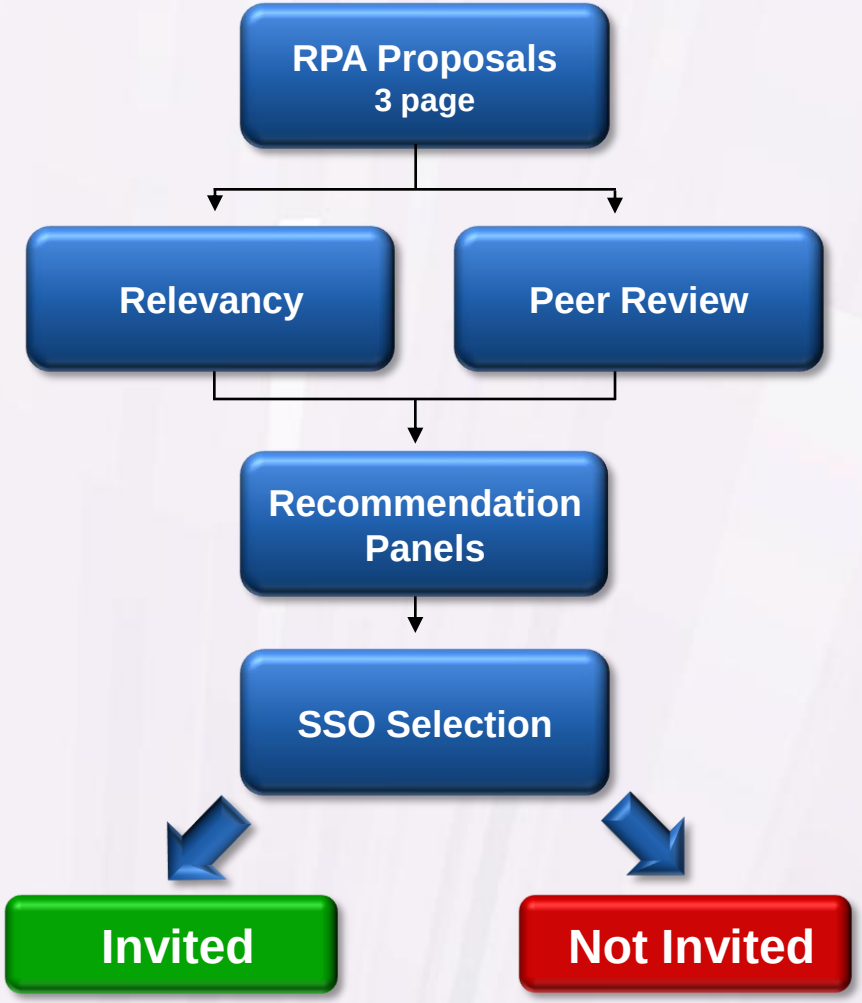
- NEUP received a total of 766 pre-applications
- Pre-applications were submitted by 199 principal and collaborating research organizations
  - 133 universities
  - 9 national laboratories
  - 43 industry
  - 14 other, including foreign entities
- These organizations represent
  - 41 U.S. states
  - 5 foreign countries
  - 19 minority institutions
  - 2 U.S. territories



Overview of the RPA Process

- The 2011 RPA opened on October 27, 2010 and closed for all but one workscope on December 9, 2010
- Two relevancy reviewers and one technical peer reviewer were assigned to each proposal
- Reviews were completed (with minor exceptions) on January 20, 2011
- Recommendation panels for each workscope were held January 25-27th with the relevancy reviewers
  - 237 pre-applications are being invited to provide a full proposal

FY2011 NEUP Review Process



RPA 3 Pagers: Submission of three page proposals by university respondents

Relevancy Reviews: Composed of two Federally selected reviewers representing technical areas

Peer Reviews: Composed of selected University or Laboratory technical peers

Recommendation Panels: Composed of Federal Directors and their selected advisors

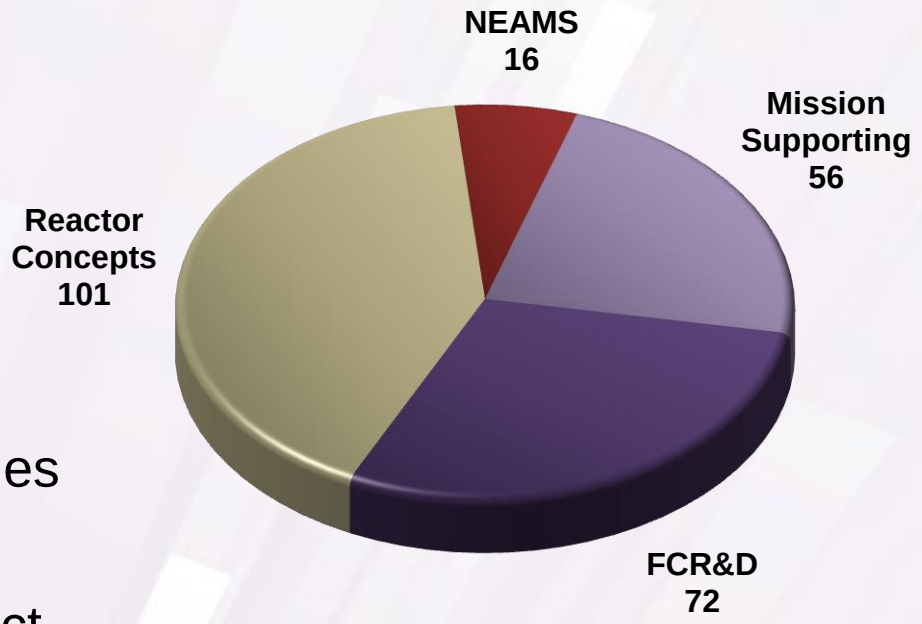
SSO Selection: Presentation of recommendations by NEUP to the SSO

Invited: Proposals selected by the SSO to submit a full proposal

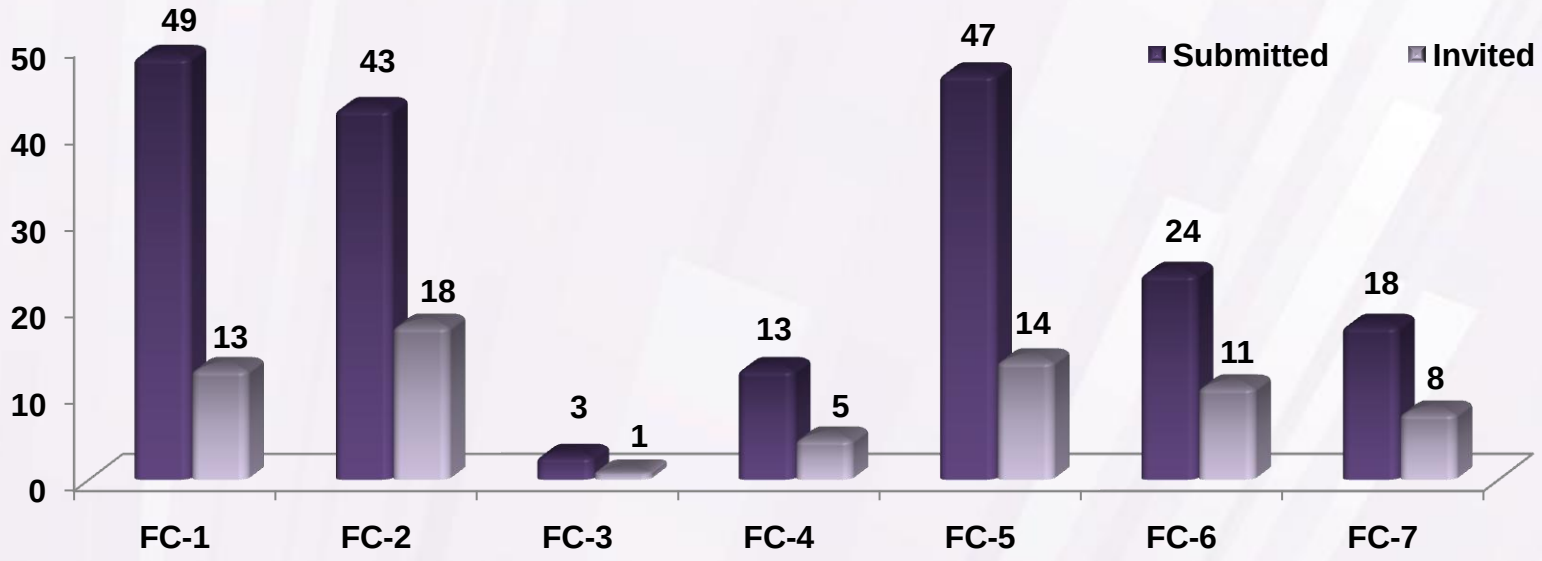
Not Invited: Proposals not selected by the SSO to submit a full proposal (may submit a full proposal, however, there is no guarantee that a full peer review will be performed)

Invited Pre-Applications

- 245 pre-applications were invited to submit full applications
- Invited pre-applications were submitted by 115 principal and collaborating research organizations:
  - 85 universities
  - 9 national laboratories
  - 18 industry
  - 3 other, include foreign entities
- These organizations represent
  - 33 U.S. states and the District of Columbia
  - 2 foreign countries
  - 11 minority institutions
  - 2 U.S. territories



Fuel Cycle R&D RPA



FC-1: Separations & Waste Forms

FC-2: Advanced Fuels

FC-3: Nuclear Theory & Modeling

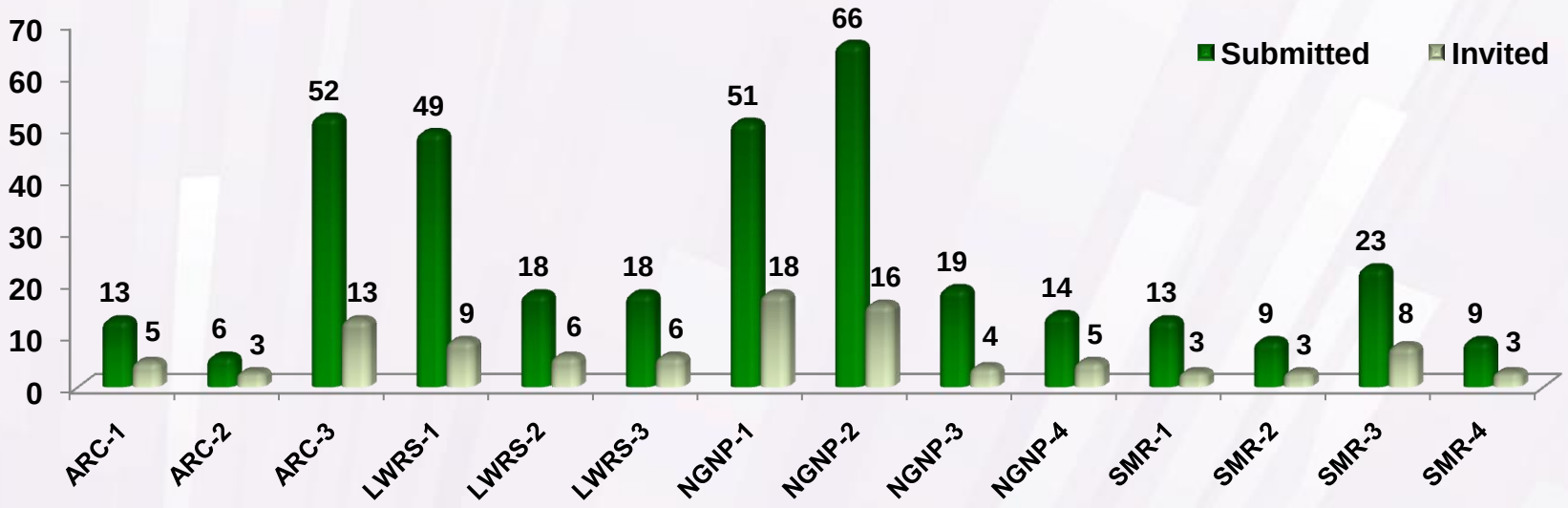
FC-4: Improved Measurement Techniques

FC-5: Materials Protection, Accountancy, & Controls Technologies

FC-6: Used Nuclear Fuel Disposition

FC-7: Fuel Cycle Simulator

Reactor Concepts RD&D RPA



ARC-1: Advanced Reactors Concept Development

ARC-2: Advanced Energy Conversion

ARC-3: Advanced Structural Materials

LWRS-1: Advanced Mitigation Strategies

LWRS-2: Risk-Informed Safety Margin Characterization

LWRS-3: Instrumentation & Control

NGNP-1: Computational Methodologies

NGNP-2: VHTR Materials

NGNP-3: VHTR TRISO Fuels

NGNP-4: VHTR Heat Transport, Energy Conversion, Hydrogen & Nuclear Heat Applications

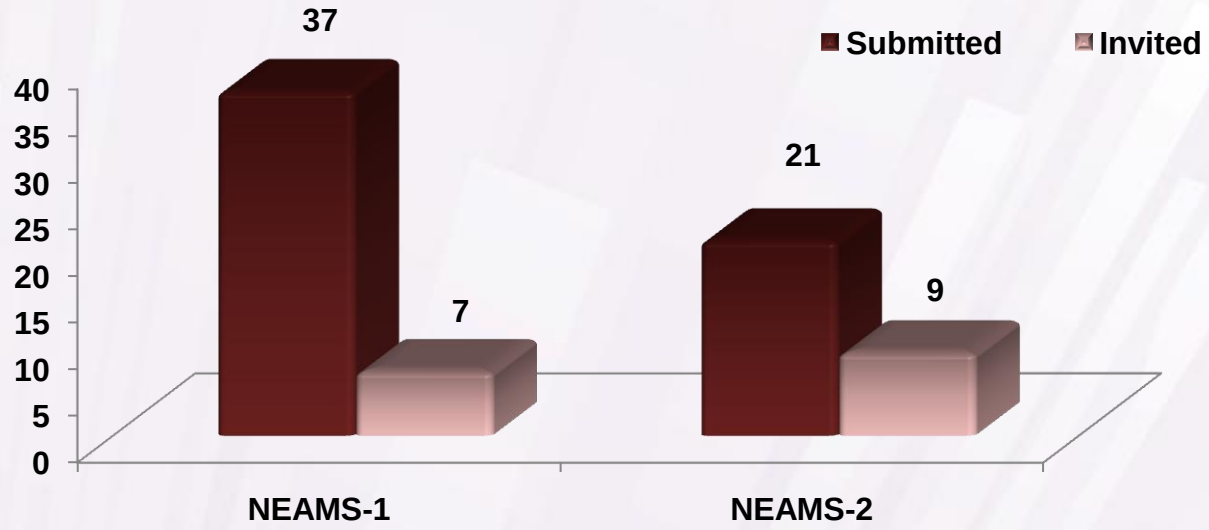
SMR-1: Novel Sensors

SMR-2: Instrumentation, Control, and Human-Machine Interface

SMR-3: Advanced Concepts

SMR-4: Assessment Methods

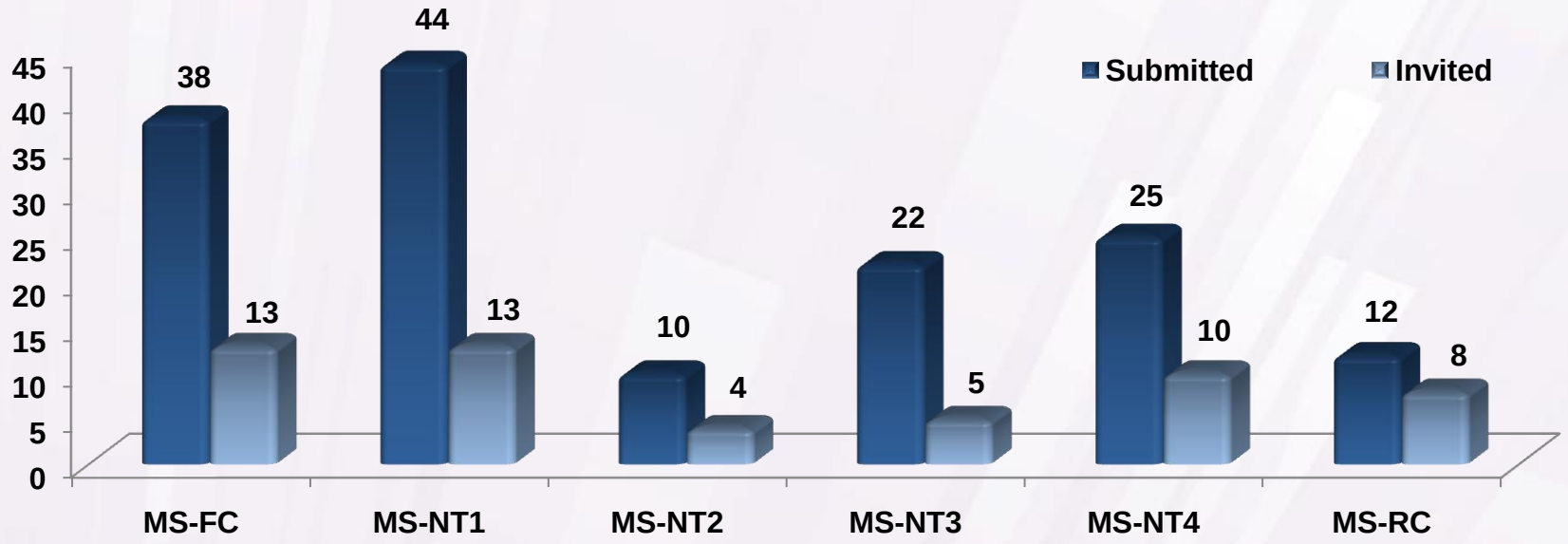
Nuclear Energy Advanced Modeling & Simulation (NEAMS) RPA



NEAMS-1: Development of Phenomena-based Methodology for Uncertainty Quantification

NEAMS-2: Development of More Efficient Computational Tools

Mission Supporting "Blue Sky" RPA



MS-FC: Fuel Cycle R&D

MS-NT1: Reactor Materials

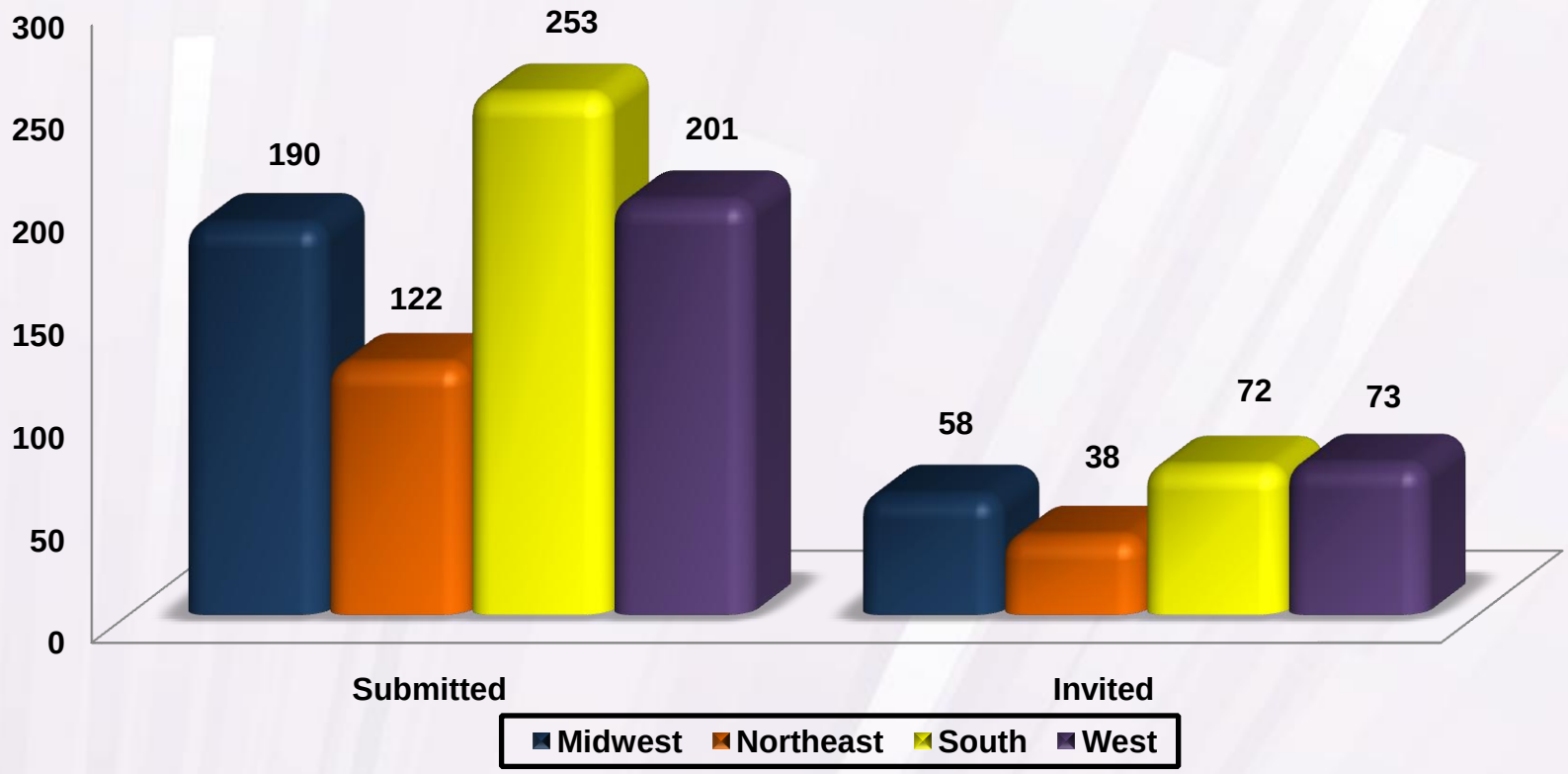
MS-NT2: Proliferation & Terrorism Risk Assessment

MS-NT3: Advanced Sensors and Instrumentation

MS-NT4: Advanced Methods for Manufacturing

MS-RC: Reactor Concepts RD&D

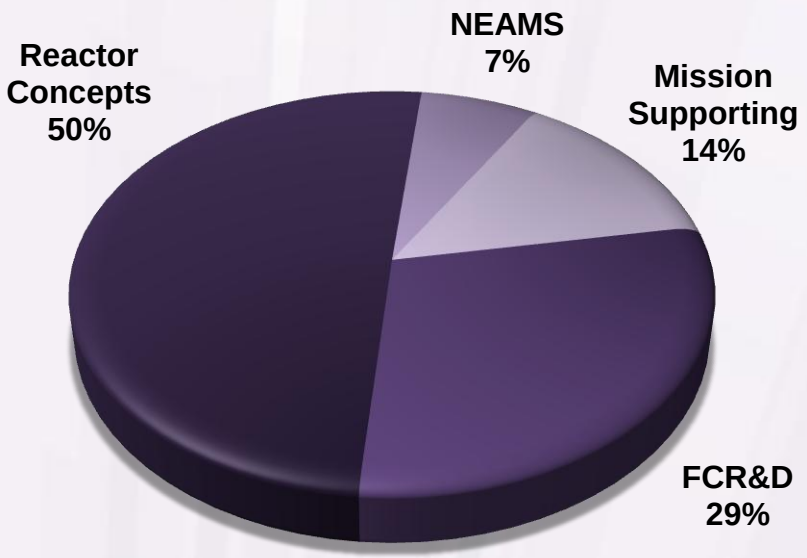
Pre-Applications by Region



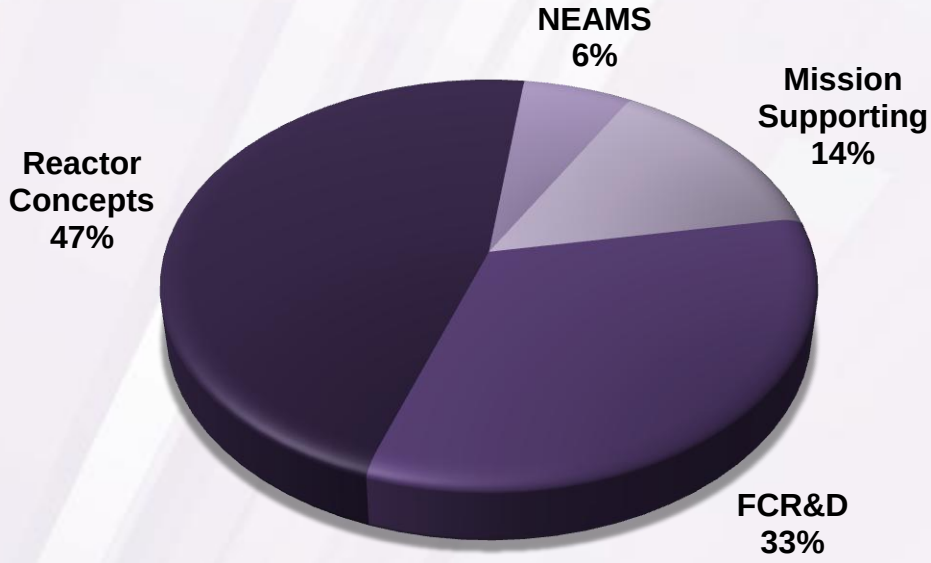
Proposed Budgets

Program	Submitted	Invited	Est. 2011 Budget
FCR&D	$190,545,094	$68,965,408	$15,500,000
Reactor Concepts	$328,138,361	$96,486,916	$15,200,000
NEAMS	$44,532,888	$12,465,000	($6,000,000)
Mission-Supporting “Blue Sky”	$89,208,135	$29,966,885	$14,000,000
Total	**$652,424,478**	**$207,884,209**	**$44,700,000**

Submitted

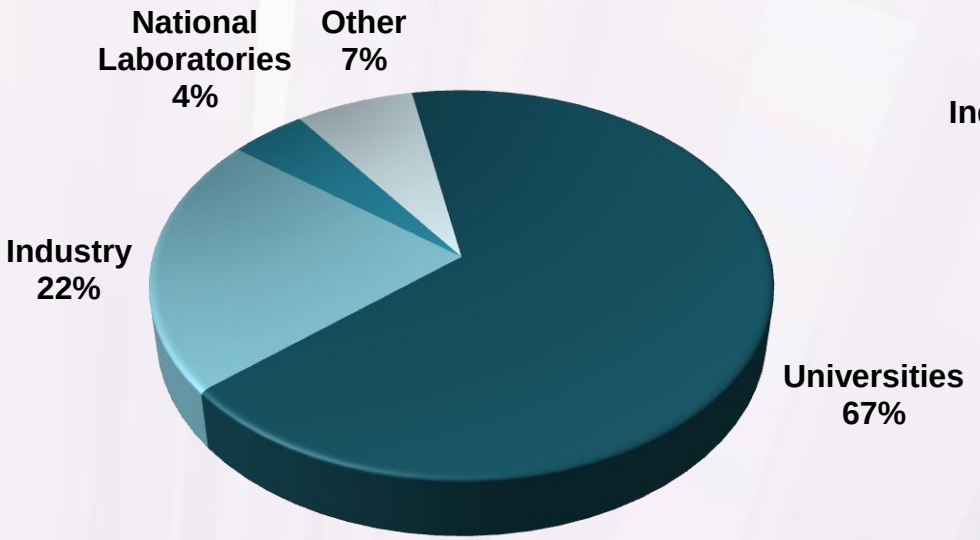


Invited

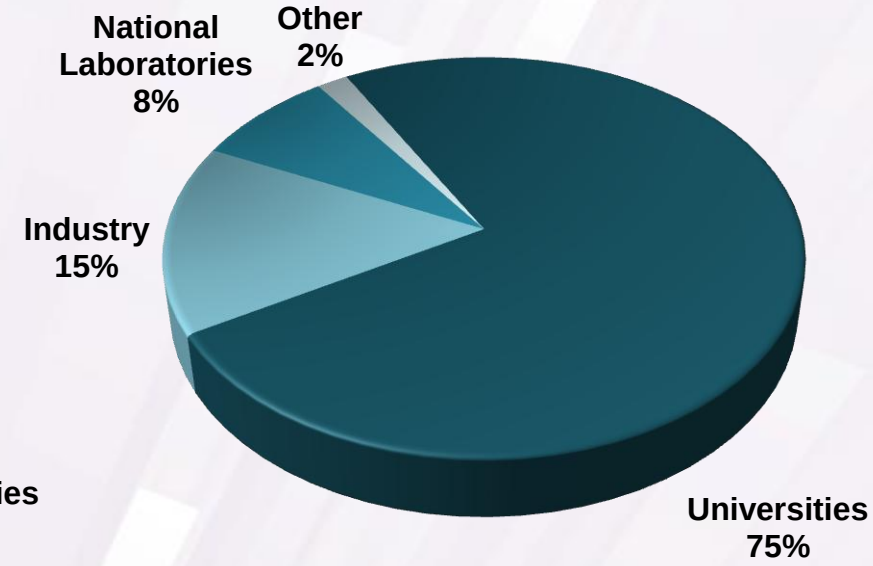


Organizational Involvement

Submitted



Invited



R&D Call for Full Proposals

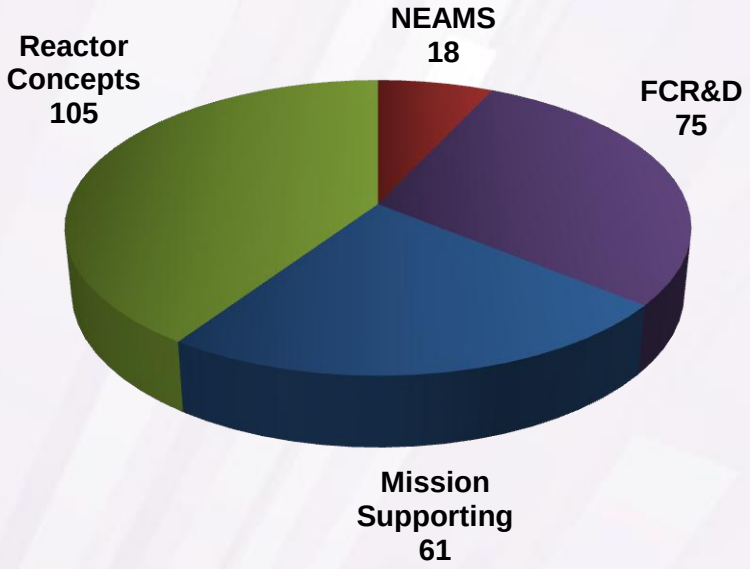
Program Overview

- 259 received proposals
  - 4 invited were not submitted
  - 18 uninvited proposals submitted
  - 10 were fully peer reviewed

- 51 recommended proposals

Proposals Received (259 Total)

- Proposals were submitted by 70 lead universities
- 55 additional organizations collaborated
  - 23 universities
  - 10 national laboratories
  - 15 industry
  - 7 other, including foreign institutions
- These organizations represent
  - 33 U.S. states and the District of Columbia
  - 10 minority institutions
  - 3 foreign countries
  - 2 U.S. territories



Review and Selection Process

Three-step selection process

- Semi-Blind Merit Review
  - Goal to achieve a mix of reviewers for each application (university, industry, lab, other)
- Proposal Selection
  - Selections were based primarily on merit review scores within workscope areas.
- Balancing Review
  - Participation by minority institutions
  - Geographic distribution

FY2011 RFP Review Process

Invited Relevancy Review: Relevancy review of all invited proposals by two federally selected relevancy reviewers

- All proposals are passed forward for full peer review

Not Invited Relevancy Review: Relevancy review of "not invited" proposals by federally selected relevancy reviewers will be performed

- Only those Program Supporting proposals that are "Highly Relevant" may be passed forward for full peer review
- Only those Mission Supporting proposals that are scored "Relevant" may be passed forward for full peer review

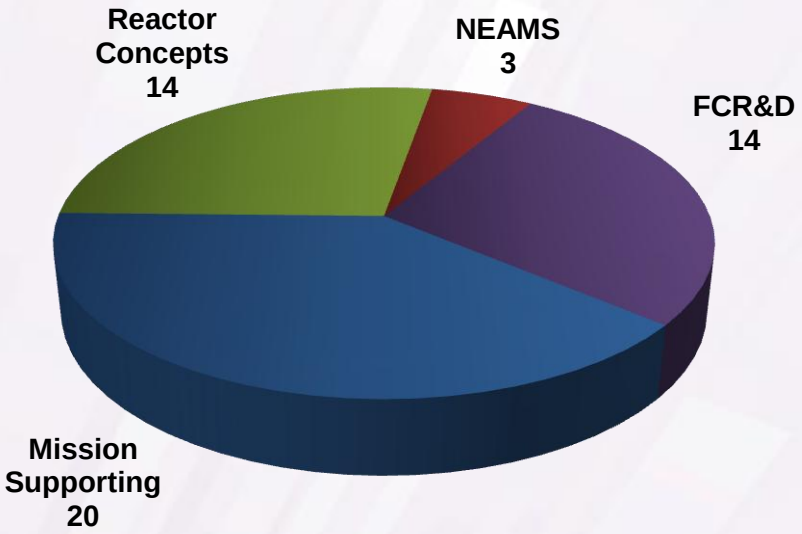
Peer Review: Full technical review by a 3 member panel of peers ("Not Invited" proposals as requested by NE program management)

Recommendation Panels: Composed of Federal Directors and their selected advisors

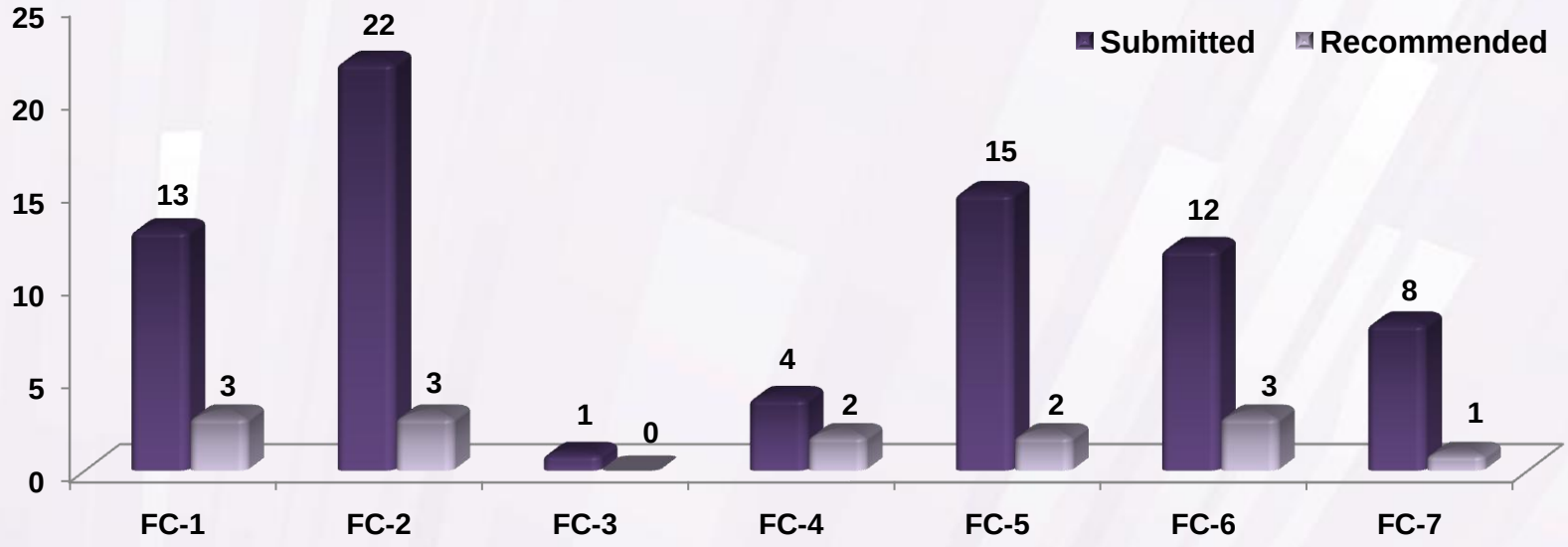
SSO Selection: Proposals selected by the SSO for funding

Selected Proposals (51 Total)

- Selected proposals are comprised of 30 lead universities
- 23 additional organizations are collaborating
  - 12 universities
  - 8 national laboratories
  - 3 industrial partners
- All participating organizations represent
  - 26 U.S. states and the District of Columbia
  - 4 minority institutions



Fuel Cycle Research and Development (FCR&D)



FC-1: Separations and Waste Forms

FC-2: Advanced Fuels

FC-3: Nuclear Theory and Modeling

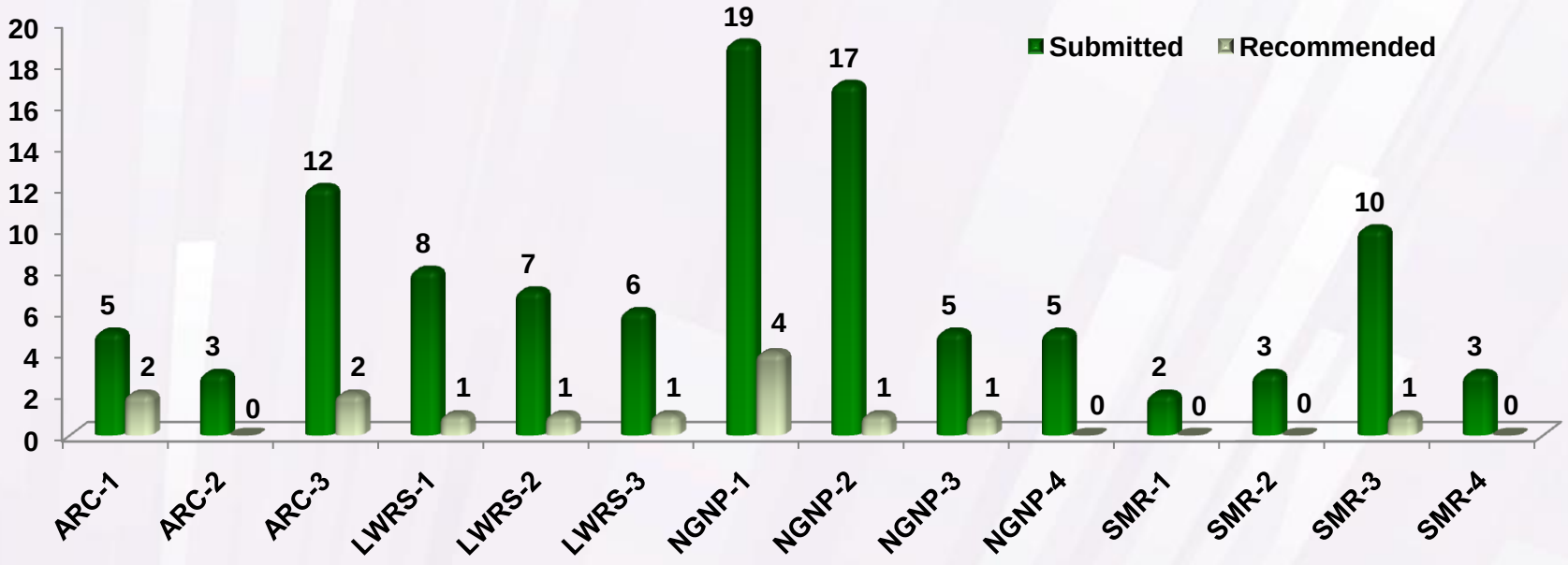
FC-4: Improved Measurement Techniques

FC-5: Materials Protection, Accountancy, and Controls Technologies

FC-6: Used Nuclear Fuel Disposition

FC-7: Fuel Cycle Simulator

Reactor Concepts



ARC-1: Advanced Reactors Concept Development

ARC-2: Advanced Energy Conversion

ARC-3: Advanced Structural Materials

LWRS-1: Advanced Mitigation Strategies

LWRS-2: Risk-Informed Safety Margin Characterization

LWRS-3: Instrumentation and Control

NGNP-1: Computational Methodologies

NGNP-2: VHTR Materials

NGNP-3: VHTR TRISO Fuels

NGNP-4: VHTR Heat Transport, Energy Conversion, Hydrogen and Nuclear Heat Applications

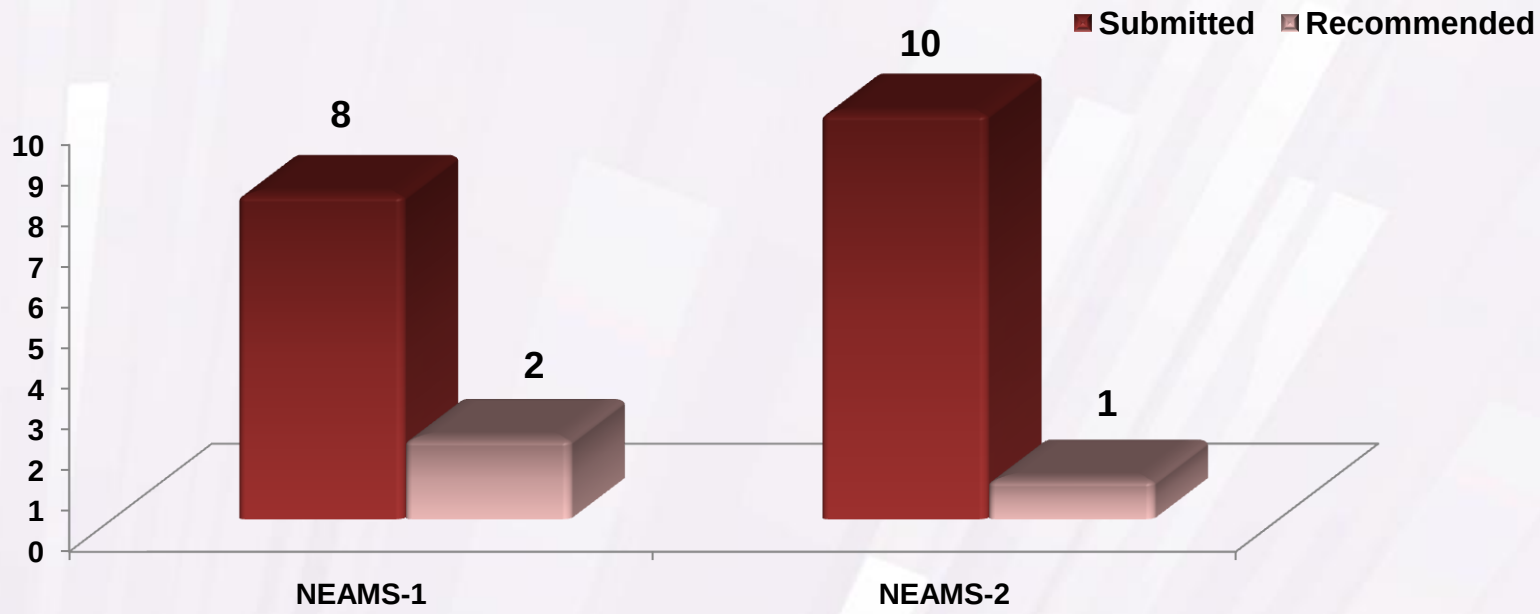
SMR-1: Novel Sensors

SMR-2: Instrumentation, Control, and Human-Machine Interface

SMR-3: Advanced Concepts

SMR-4: Assessment Methods

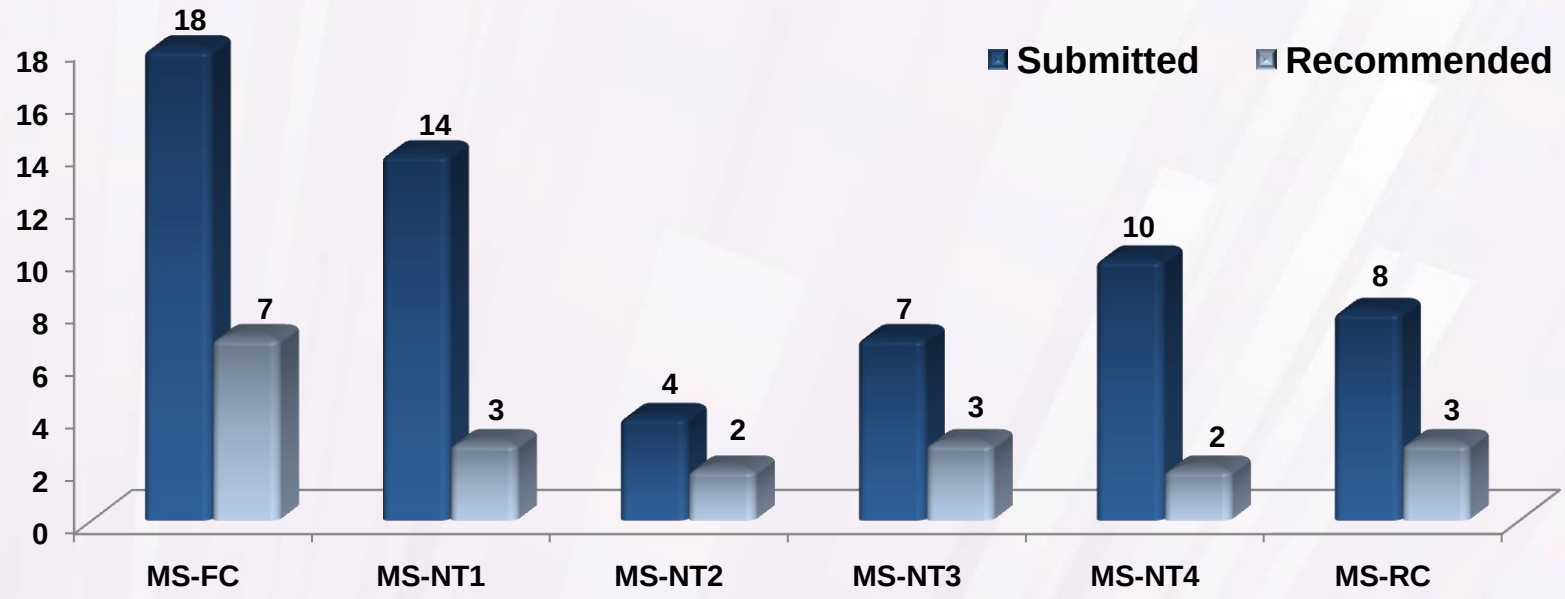
Nuclear Energy Advanced Modeling & Simulation (NEAMS)



NEAMS-1: Development of Phenomena-based Methodology for Uncertainty Quantification

NEAMS-2: Development of More Efficient Computational Tools

Mission Supporting "Blue Sky"



MS-FC: Fuel Cycle R&D

MS-NT1: Reactor Materials

MS-NT2: Proliferation & Terrorism Risk Assessment

MS-NT3: Advanced Sensors and Instrumentation

MS-NT4: Advanced Methods for Manufacturing

MS-RC: Reactor Concepts RD&D

Funding for Recommended Proposals

Program	Submitted	Recommended	2011 Budget
FCR&D	$75,292,042	$11,801,179	$12,101,948
Reactor Concepts	$98,955,350	$11,922,197	$11,897,142
NEAMS	$14,448,702	$4,906,664	$4,906,664
Mission-Supporting “Blue Sky”	$35,605,375	$9,870,014	$9,870,014
Total	**$224,301,469**	**$38,617,247**	**$38,775,767**

Overview of MSI Involvement

City College of New York: Lead on 3 recommended proposals; Collaborator on 1 recommended proposal

Prairie View A&M: Collaborator on 2 recommended proposals

Fisk University: Collaborator on 1 recommended proposal

University of Houston: Lead on 1 recommended proposal

Relevancy Review: 522 Reviews

Technical Merit Reviews: 748 Reviews

- 222/249 applications had at least two types of reviewers represented
- 22 had only university reviewers
- 4 had only national laboratory reviewers
- 1 had only industry reviewers

Technical Merit Reviewers

- **389 individuals served as merit reviewers**
  - 144 from national laboratories
  - 202 university professors
  - 24 from industry
  - 9 DOE, NNSA, or NRC
  - 8 from Foreign Institutions
- **Reviewers drawn from about 127 different organizations, including**
  - 10 national laboratories
  - 80 universities
  - 19 private companies
  - 8 foreign institutions
- **Reviewers evaluated up to 6 proposals, performing an average of 1.9 each**
- **739 total evaluations conducted**

Infrastructure

Minor/Major Reactor Upgrade

Major Reactor Upgrade

- 9 proposals from universities in 8 states submitted for a monetary value of $11,249,769

Minor Reactor Upgrade

- 13 proposals from universities in 6 states submitted for a monetary value of $2,795,421 ($763,874 in cost match)

General Scientific Equipment

- 61 proposals from universities in 33 states submitted for a monetary value of $16,250,089

Review Criteria

Major / Minor Reactors

- *Impact (50%).* Enhance safety, performance, control or operational capability; increase quality, security or efficiency; expand research, teaching or training
- *Use (20%).* Enhance the number of users or variety of research

General Scientific Equipment

- *Impact (50%).* Potential to expand research or training capabilities
- *Use (20%).* Amount of student or faculty use, amount and variety of research/services provided by the facility

Both also contain Key Personnel (20%) and Reasonableness (10%)

Initial Review

Major Reactor, Minor Reactor, and General Scientific Equipment were all subject to initial review of full applications (DOE) to verify the following:

- Applicant eligibility;
- Submission of required information;
- Satisfaction of all mandatory requirements;
- Responsive to the objectives of the FOA.

Merit Review

Major and Minor reactor upgrades were evaluated against the following criteria:

- ***Impact*** *(50%).* Enhance safety, performance, control or capability; increase quality, safety/security or efficiency; expand research, teaching or training
- ***Use*** *(20%).* Enhance the number of users or variety of research
- ***Reasonableness*** *(10%).* Objectives and cost
- ***Key Personnel*** *(20%).* Adequacy and qualifications

Equipment Review

General Scientific Equipment proposals were evaluated against the following criteria:

- ***Impact*** *(50%).* Potential to expand research or training capabilities
- ***Use*** *(20%).* Amount of student or faculty use, amount and variety of research/services provided by the facility
- ***Reasonableness*** *(10%).* Objectives and cost
- ***Key Personnel*** *(20%).* Adequacy and qualifications